FORM PTO-1390 (REV. 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: SAIC 19.190

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 10/031552

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/08531	31 August 2000 (31.08.00)	03 September 1999 (03.09.99)

TITLE OF INVENTION: Improved Method for the Production of Slabs of Ceramic Material

APPLICANT(S) FOR DO/EO/US: TONCELLI, Marcello

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is attached hereto (required only if not communicated by the International Bureau).
   b. [X] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [ ] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [X] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [X] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [ ] A FIRST preliminary amendment.
14. [ ] A SECOND or SUBSEQUENT preliminary amendment.
15. [ ] A substitute specification.
16. [ ] A change of power of attorney and/or address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. [ ] A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [X] Other items or information: **Copy of WO 01/17741.**

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-1290.

Filed by Express Mail (Receipt No. EL818388769US) on January 18, 2002 pursuant to 37 C.F.R. 1.10.
by

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
10/031552	PCT/EP00/08531	SAIC 19.190

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):	CALCULATIONS PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1000.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $860.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $710.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $690.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	5 - 20 =	0	x $18.00	$
Independent claims	1 - 3 =	0	x $80.00	$
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $270.00	$
TOTAL OF ABOVE CALCULATIONS =				$ 860.00
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			+	$
SUBTOTAL =				$ 860.00
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$
TOTAL NATIONAL FEE =				$ 860.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property			+	$
TOTAL FEES ENCLOSED =				$ 860.00
			Amount to be refunded:	$
			charged:	$

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 50-1290 in the amount of $ 860.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-1290 . A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
ROSENMAN & COLIN LLP
575 Madison Avenue
New York, New York 10022-2585
(212) 940-8800
(212) 940-8986

SIGNATURE

Brian S. Myers
NAME

46,947
REGISTRATION NUMBER

"Improved method for the production of slabs of ceramic material"

The present invention relates to a method for the manufacture of slabs of ceramic material and, more specifically, to an improvement relating to the method and plant described, illustrated and claimed in Italian patent No. 1,293,176 filed on 15 April 1997 (corresponding to WO-A-9846453) of the same applicant.

The slabs of ceramic material to which both the method according to the present invention and that of the above mentioned patent refer are the subject of European patent No. 378,275 and are manufactured from a ceramic mixture consisting of a granulate complying with specific parameters as regards particle size and of an aqueous inorganic binder which has special composition characteristics and for the details of which reference should be made to the text of the aforementioned European patent.

During the implementation of said method it was noted that some stages posed certain problems as regards an industrial production, said problems having been solved with the method and plant according to the above mentioned Italian patent.

This latter method and plant envisaged the following operations:

1. Depositing a layer of fabric (felt) onto the moulding support;
2. Arranging a sheet of a paper permeable to water vapour on top of the fabric layer;
3. Depositing the ceramic mixture onto the sheet of paper, if necessary in two separate stages with insertion, after the first stage, of a mesh of reinforcing material to be embedded in the slab body;
4. Depositing a sheet of rubber onto the layer of mixture;
5. Vibrating compression under vacuum performed above the rubber sheet;
6. Removal of the rubber sheet;
7. Transfer of the "virgin" slab onto a metal-grid support by means of pincer means gripping the edge of the felt;
8. Drying treatment of the slab;
9. Raising of the dried slab and removal of the fabric layer;
10. Applying a layer of refractory material (engobe) onto the upper surface of the dried slab (previously lined with the rubber sheet) and drying thereof;
11. Overturning the slab so that it rests on the engobe-lined surface and introduction into the firing kiln, with simultaneous burning of the paper sheet still adhering

to the now visible surface of the dried slab.

The slab thus obtained then undergoes the usual finishing operations, such as sizing, polishing, etc.

A major problem during this production process has been that of performing drying of the slab after the moulding phase (namely after vibrating compression under vacuum) in a rapid and as homogeneous as possible manner.

It is obvious that, in order to achieve this object, the surfaces of the moulded slab must be as free as possible and therefore exposed to the action of the drying means (for example hot air).

However, the "virgin" slab is necessarily formed on a support capable of withstanding a vibrating compression and cannot be handled before, because of drying it reaches a sufficient degree of rigidity so as to become self-supporting at least for performing the albeit minor handling operations required in order to convey it to the final firing stage.

For this reason, the technology applied hitherto and described in the aforementioned Italian patent uses a layer of fabric or felt which allows the passage of the water vapour from the mixture and a sheet of paper arranged between felt and mixture, said sheet performing multiple functions, namely:

(i) physically separating the mixture from the felt or fabric;

(ii) absorbing excess water, which is mainly naturally expelled from the mixture layer during the vibrating compression stage, and

(iii) preventing the formation of folds which are also due to the mixture water and which could result in bending of the final slab.

For this reason, the method according to the above mentioned Italian patent uses a thin sheet of paper permeable to water vapour which is arranged above a layer of fabric, preferably felt, which also performs the function of absorbing and allowing the water to pass through during drying.

In the practical implementation of this method, the thin sheet of paper, which is completely saturated with water, is preferably treated so that, after drying, it does not form folds which could damage the final slab.

It has now been found, and accordingly is the subject of the present invention, that, by modifying certain stages of the above mentioned method and altering the nature of one of the elements used in the said method, the latter is substantially improved.

These modifications consist mainly in replacing the thin sheet of treated paper with a sheet of paper of considerable thickness, which is usually classified as cardboard or paperboard, depending on the thickness and use, so as to absorb all the excess water without forming folds after vacuum vibro-compression and the drying stage. Herebelow, for the sake of simplicity, this sheet will be simply referred to as "paperboard".

The present invention therefore in its most general definition consists of a method for the production of slabs of ceramic material, of the type in which a mixture of a granulated material and a water-based binder, deposited in a metered quantity on a temporary support, undergoes a stage of vibrating compression under vacuum, followed by a drying stage during which the vibro-compressed mixture is supported by a porous material, and a firing stage, during which the dried slab rests on the firing surface by means of a temporary protective layer of refractory material (engobe), characterised in that said mixture, prior to the stage of vibrating compression under vacuum, is enclosed between two sheets, respectively a first sheet and second sheet, of cardboard or paperboard of sufficient thickness for absorbing the excess mixture water, said sheets being removed prior to said drying stage.

Therefore, the method according to Italian patent 1,293,176 is modified by envisaging the following operations:

1. Depositing a temporary support layer onto the moulding support;
2. Arranging, on top of the temporary support layer, a first sheet of paperboard of suitable thickness for absorbing the excess mixture water;
3. Depositing the ceramic mixture onto the sheet of paper, if necessary in two separate stages with insertion, after the first stage, of a mesh of reinforcing material to be embedded in the slab body;
4. Depositing a second sheet of paperboard, similar to the said first sheet according to step (3), onto the mixture layer;
5. Vibrating compression under vacuum performed above said second sheet of paperboard;
6. Removal of the second sheet of paperboard which is replaced with a layer of porous felt or other material permeable to water vapour in the form of a cloth;
7. Overturning the "virgin", that is rough-formed slab and removing in sequence the said temporary support layer and said first sheet of paperboard;
8. Transferring the slab onto a metal-grid support by means of pincer means

gripping the edge of the porous felt or permeable cloth;

9. Drying treatment of the slab while resting on the said grid by means of the porous felt or permeable cloth;

10. Raising the dried slab and removing the layer of porous felt or permeable cloth;

11. Applying a layer of refractory material (engobe) onto the upper surface of the dried slab and drying thereof;

12. Overturning the layer so that it rests on the engobe-lined surface and introduction into the firing kiln.

Comparing this method with the above summarised method according to Italian patent 1,293,176 it is easy to understand the advantages which arise therefrom and which may be summed up in the following points:

Firstly, during the drying stage, the bottom surface of the rough-formed or "virgin" slab, i.e. that resting on the layer of cloth or felt, is no longer lined with the thin sheet of paper permeable to water vapour which, no matter how thin, in any case prevents removal of the water vapour.

Secondly, before the firing stage, both the surfaces of the dried rough-formed slab are free, therefore allowing application of the layer of refractory material to any one of the two surfaces. On the contrary in the method according to the prior Italian patent one of the surfaces of the dried slab undergoes the firing stage with a thin sheet of paper firmly adhering it, such that removal thereof is performed by means of burning during firing. According to the method according to the present invention, on the other hand, it is possible to decide to which surface the engobe is to be applied. For example, if one of the two surfaces has surface defects, the engobe is applied to the other surface since it is preferable to avoid that the first surface (i.e. the surface with defects) is the surface which is visible in the finished slab and therefore prevent this surface from undergoing excessive sizing in order to eliminate the surface defects.

In the practical implementation of the present invention it has been seen that, in place of the cloth or felt support, the temporary support may also consist of rubber (such as a rubberised tape) which is intrinsically more resistant to the stress which is applied during the course of vibrating compression. In fact, as mentioned, this temporary support, at the end of the vacuum compression stage, is removed and does not interfere with the drying stage.

Moreover, a temporary rubber support, which does not come into contact with the mixture and therefore does not require any particular maintenance, may be reused a practically unlimited number of times, while the porous fabric or felt used in the previous method has a limited working life.

Finally, the cardboard or paperboard which replaces the thin layer of treated paper according to the prior art is undoubtedly less highly valued and therefore less costly.

As regards the plant described and claimed in Italian patent No. 1,293,176, it may be used to implement the method according to the invention with slight modifications, i.e. the addition of a unit for depositing a layer of porous felt or other rubber-based permeable material onto the rough-formed slab emerging from the vibrating compression under vacuum of a first unit for overturning the slab, for example by means of a pair of sandwich surfaces, downstream of the above porous felt deposition unit, and a unit for removing this porous felt downstream of the drying stage.

Although the invention has been described in relation to a preferred embodiment, it is understood that conceptually and mechanically equivalent modifications and variants are possible and may be envisaged without the scope of the following claims.

Claims

1. Method for the production of slabs of ceramic material, of the type in which a mixture of a granulated material and a water-based binder deposited in a metered quantity on a temporary support, undergoes a stage of vibrating compression under vacuum and then a drying stage, during which the vibro-compressed mixture is supported by a porous material, and a firing stage, during which the dried slab rests on the firing surface by means of a temporary protective layer of refractory material (engobe), characterised in that said mixture, prior to the stage of vibrating compression under vacuum, is enclosed between two sheets, respectively a first sheet and a second sheet, of cardboard or paperboard of sufficient thickness for absorbing the excess mixture water, said sheets being removed prior to said drying stage.

2. Method for the production of slabs of ceramic material according to Claim 1, characterised in that said porous material supporting the vibro-compacted slab during drying is a cloth or felt which is deposited on the upper surface of the vibro-compacted slab after removal of the said second sheet of paperboard so that, following the subsequent overturning of the slab, said porous cloth or felt forms the temporary support for the slab during drying.

3. Method for the production of slabs of ceramic material according to Claim 2, characterised in that said first sheet of paperboard is deposited on a temporary support so that the mixture is deposited on said first sheet of paperboard, said temporary support and said first sheet of paperboard being removed after said vibrating compression stage and after the vibro-compacted slab, the upper surface of which has been lined with said porous cloth or felt, has undergone the said overturning stage prior to the drying stage.

4. Method for the production of slabs of ceramic material according to Claim 3, characterised in that said temporary support consists of a cloth, in particular a felt, or a rubberised tape.

5. Method for the production of slabs of ceramic material according to Claim 2, characterised in that, after said drying stage, the resultant dried rough-formed slab is raised so as to remove said layer of porous felt or other permeable material on which it was resting during drying.

UNITED STATES
DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: Improved method for the production of slabs of ceramic material.

the specification of which
(check one) [X] is attached hereto
[ ] was filed on _____ as
Application Serial No. _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by an amendment referred to above.
I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).
I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s) (Number)	(Country)	(Day/Month/Year Filed)	Priority Claimed Yes	No
TV99A000095.	ITALY	03 September 1999	X	
			Yes	No
(Number)	(Country)	(Day/Month/Year Filed)		
			Yes	No
(Number)	(Country)	(Day/Month/Year Filed)		

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status-patented, pending, abandoned)

I hereby appoint as my attorney and agent **Aaron B. Karas, Reg. No. 18,923; Samson Helfgott, Reg. No. 23,072; Leonard Cooper, Reg. No. 27,625; Emma Shleifer, Reg. No. 29,734; Linda S. Chan, Reg. No. 42,400; Harris A. Wolin, Reg. No. 39,432; Michael Markowitz, Reg. No. 30,659;** and **Brian Myers Reg. No. 46,947** to prosecute this application and to transmit all business in the Patent and Trademark Office connected therewith.
Address all correspondence to:

HELFGOTT & KARAS, P.C.
Empire State Building, 60th Floor
New York, New York 10118-0110
Telephone No.: (212) 643-5000

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the Untied States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Marcello TONCELLI
Inventor's Signature Marcello Toncelli Date 03 October 2001
Residence Bassano del Grappa (Vicenza) ITALY Citizenship Italian
Post Office Address Via Papa Giovanni XXIII, 2 - 36061 Bassano del Grappa (Vicenza) ITALY

Full name of second joint inventor, if any _____
Second Inventor's Signature _____ Date _____
Residence _____ Citizenship _____
Post Office Address _____

Full name of third joint inventor, if any _____
Third Inventor's Signature _____ Date _____
Residence _____ Citizenship _____
Post Office Address _____